

In the claims:

1. (Currently Amended) A computer-implemented method comprising:
receiving ~~one of a plurality of types of virtual machine (VM) entry instructions an~~
instruction executed by a Virtual Machine Monitor (VMM), wherein the instruction is one of
a first type to indicate a first type of request or a second type to indicate a second type of
request, wherein the first type is for an initial transition to a VM and the second type is for a
subsequent transition to the VM;
identifying, based on whether the instruction is of the first type or the second type a
VM launch or a VM resume instruction, that an initial transition from the VMM to one or
more virtual machines (VMs) the VM is about to occur; and
utilizing processor-managed resources associated with the one or more VMs VM
based on the initial transition.
- 2-4. (Canceled)
5. (Previously Presented) The method of claim 1 wherein the instruction executed by the VMM is a VM launch instruction.
6. (Previously Presented) The method of claim 1 wherein identifying the initial transition comprises determining the initial transition is about to occur by logic within a processor.
7. (Original) The method of claim 6 wherein the logic within the processor is prediction logic.
8. (Original) The method of claim 1 wherein utilization of processor-managed resources includes at least one of allocation of one or more processor-managed resources, de-allocation

of one or more processor-managed resources, verification of data stored in one or more processor-managed resources, invalidation of data stored in one or more processor-managed resources, and loading of data into one or more processor-managed resources.

9. (Currently Amended) A computer-implemented method comprising:
- determining that ~~an initial~~ a transition from a virtual machine monitor (VMM) to a virtual machine (VM) is about to occur based on receiving an instruction invocation information of the VM;
 - determining the type of the transition based on the whether the instruction is one of a first type to indicate a first type of transition or a second type to indicate a second type of transition, wherein the first type an initial transition to the VM and the second type is a subsequent transition to the VM; and
 - notifying a processor of the initial type of the transition ~~by the VMM executing one of a plurality of types of VM entry instructions.~~

10-11. (Canceled)

12. (Previously Presented) The method of claim 11 further comprising allocating a memory region for a new virtual machine control structure (VMCS) associated with the VM, and requesting the processor to activate the new VMCS.

13. (Original) The method of claim 12 wherein requesting the processor to activate the new VMCS comprises executing a VMCS pointer load instruction including a pointer to the new VMCS as an operand.

14. (Original) The method of claim 12 further comprising requesting the processor to initialize the new VMCS.

15. (Original) The method of claim 14 wherein requesting the processor to initialize the new VMCS comprises executing a VMCS clear instruction including the pointer to the new VMCS as an operand.

16. (Original) The method of claim 12 further comprising:
upon requesting the processor to activate the new VMCS, requesting the processor to set execution control information, VMM state information and VM state information in the new VMCS.
17. (Original) The method of claim 16 wherein requesting the processor to set execution control information, VMM state information and VM state information in the new VMCS comprises executing a VMCS write instruction having an operand that identifies a component of the new VMCS to which data is to be written.
18. (Canceled)
19. (Currently Amended) A computer-implemented method comprising:
~~identifying execution by a virtual machine monitor (VMM) of one of a plurality of types of virtual machine (VM) entry instructions, the one of the plurality of types being associated with an initial transition from the VMM to a VM, the initial transition being based on invocation information of the VM;~~
receiving, from a virtual machine monitor (VMM), an instruction to request a transition from the VMM to a virtual machine (VM), wherein the instruction is one of a first type to indicate a first type of transition or a second type to indicate a second type of transition, wherein the first type is an initial transition to the VM and the second type is a subsequent transition to the VM; and
performing a set of operations according to the ~~initial type of the~~ transition.
- 20-21. (Canceled)
22. (Currently Amended) The method of claim 19 wherein further comprising:
prior to receiving the request to perform the transition, receiving from the VMM a pointer to a virtual machine control structure (VMCS) associated with the VM.

23. (Original) The method of claim 22 wherein the pointer to the VMCS is included as an operand of a VMCS pointer load instruction.
24. (Currently Amended) The method of claim 22 wherein:
the type of the transition is an initial transfer to the VM; and
 performing the set of operations comprises marking the VMCS as cleared when receiving a request from the VMM to initialize the VMCS, determining that the VMCS is in a cleared state, performing a plurality of validation checks on at least one of VMM state information and VM state information, storing the VMM state information to the VMCS, loading the VM state information into a processor storage, marking the VMCS as launched, and beginning to execute the VM.
25. (Original) The method of claim 24 wherein the request to initialize the VMCS is a VMCS clear instruction executed by the VMM, the VMCS clear instruction including the pointer to the VMCS as an operand.
26. (Original) The method of claim 22 wherein performing the set of operations further comprises allocating an on-processor cache storage for the VMCS upon determining that the VMCS is in a cleared state, and caching information stored in the VMCS to the on-processor cache storage during operation of the VM.
- 27-29. (Canceled)
30. (Currently Amended) An apparatus comprising a hardware platform with a processor and a memory that operate in tandem to implement:
 a processor notification module in ~~the~~ a virtual machine monitor (VMM) to notify ~~[[a]]~~ the processor of a transition from the VMM to a virtual machine (VM) using an instruction, wherein the instruction is one of a first type to indicate a first type of transition or a second type to indicate a second type of transition, wherein the first type is for an initial transition to the VM and the second type is for a subsequent transition to the VM one or more virtual machines (VMs);

a resource use determinator to identify, based on the notification, that the transition is an initial rather than a subsequent transition from the VMM to the VM ~~one or more VMs~~; and

a resource optimizer to utilize processor-managed resources including processor registers, processor cache, memory, and input/output (I/O) devices associated with the VM ~~one or more VMs~~ based on the initial transition.

31-32. (Canceled)

33. (Previously Presented) The apparatus of claim 30 further comprising a VMM behavior predictor in a processor to predict the initial transition.

34. (Original) The apparatus of claim 30 wherein the resource optimizer is to utilize the processor-managed resources by performing at least one of allocation of one or more processor-managed resources, de-allocation of one or more processor-managed resources, verification of data stored in one or more processor-managed resources, invalidation of data stored in one or more processor-managed resources, and loading of data into one or more processor-managed resources.

35. (Currently Amended) An apparatus comprising a hardware platform with a processor and a memory that operate in tandem to implement:

a transition type determinator to determine that ~~an initial~~ a transition from a virtual machine monitor (VMM) to a virtual machine (VM) is about to occur and to determine a type of the transition based on invocation information of the VM; and

a VMM operation controller to notify a processor of the ~~initial type of~~ transition by the VMM executing ~~one of a plurality of VM entry instructions, the one of the plurality of VM entry instructions associated with a VM launch rather than a VM resume an instruction, wherein the instruction is one of a first type to indicate a first type of transition or a second type to indicate a second type of transition, wherein the first type is for an initial transition to~~

a VM and the second type is for a subsequent transition to the VM.

36. (Canceled)

37. (Currently Amended) The apparatus of claim 35 wherein the VMM operation controller is to respond to a determination that the transition is an [[the]] initial transfer to the VM by allocating a memory region for a new virtual machine control structure (VMCS) associated with the VM, requesting the processor to initialize the new VMCS, requesting the processor to activate the new VMCS, and requesting the processor to set execution control information, VMM state information and VM state information in the new VMCS.

38. (Original) The apparatus of claim 37 wherein the VMM operation controller is to request the processor to activate the new VMCS by executing a VMCS pointer load instruction including a pointer to the new VMCS as an operand.

39. (Original) The apparatus of claim 37 wherein the VMM operation controller is to request the processor to initialize the new VMCS by executing a VMCS clear instruction including the pointer to the new VMCS as an operand.

40. (Canceled)

41. (Currently Amended) An apparatus comprising a hardware platform with a processor and a memory that operate in tandem to implement:

a notification receiver to receive, from a virtual machine monitor (VMM), an instruction to request a transition from the VMM to a virtual machine, the instruction indicating a type of the transition, wherein the transition is one of an initial transition and a subsequent transition;

identify execution by a virtual machine monitor (VMM) of one of a plurality of types of virtual machine (VM) entry instructions, the one of the plurality of VM entry instructions associated with an initial transition from the VMM to a VM, the initial transition being based on invocation information of the VM; and

an operation performer to perform a set of operations according to the initial type of the transition.

42. (Canceled)

43. (Original) The apparatus of claim 41 wherein the notification receiver is further to receive from the VMM a pointer to a virtual machine control structure (VMCS) associated with the VM.

44. (Original) The apparatus of claim 41 wherein the pointer to the VMCS is included as an operand of a VMCS pointer load instruction executed by the VMM.

45. (Previously Presented) The apparatus of claim 41 wherein the operation performer is to respond to a VMM request for an initial transition to the VM by determining that the VMCS is in a cleared state, performing a plurality of validation checks on at least one of VMM state information and VM state information, storing the VMM state information to the VMCS, loading the VM state information into a processor storage, marking the VMCS as launched, and beginning to execute the VM.

46. (Original) The apparatus of claim 45 wherein the operation performer is further to allocate an on-processor cache storage for the VMCS upon determining that the VMCS is in the cleared state and to cache information stored in the VMCS to the on-processor cache storage during operation of the VM.

47-49. (Canceled)

50. (Currently Amended) A system comprising:

a memory; and

a processor coupled to the memory; and

processor-managed resources coupled to the processor that are associated with one or

more virtual machines (VMs), wherein the processor is to:

~~receive one of a plurality of types of VM entry instructions~~ an instruction
executed by a Virtual Machine Monitor (VMM), ~~wherein the instruction is one of a~~
first type to indicate a first type of request or a second type to indicate a second type
of request, wherein the first type is for an initial transition to a VM and the second
type is for a subsequent transition to the VM;

identify, based on whether the instruction is of the first type or the second
type, that an initial transition from the VMM to the one or more VMs is about to
occur; and

utilize the processor-managed resources based on the initial type of transition.

51-52. (Canceled)

53. (Currently Amended) A system comprising:

a memory to store guest software; and

a processor, coupled to the memory to:

~~identify execution by a virtual machine monitor (VMM) of one of a plurality~~
~~of virtual machine (VM) entry instructions, the one of the plurality of VM entry~~
~~instructions associated with an initial transition from the VMM to the guest software,~~
~~the initial transition being based on invocation information of the guest software;~~

receive, from a virtual machine monitor (VMM), an instruction to request a
transition from the VMM to a virtual machine (VM), wherein the instruction is one of
a first type to indicate a first type of transition or a second type to indicate a second
type of transition, wherein the first type is an initial transition to the VM and the
second type is a subsequent transition to the VM; and

perform a set of operations according to the initial type of transition.

54-55. (Canceled)

56. (Currently Amended) A machine-readable medium containing instructions which,

when executed by a processing system, cause the processing system to perform a method, the method comprising:

determining that ~~an initial~~ a transition from a virtual machine monitor (VMM) to a virtual machine (VM) is about to occur based on receiving an instruction invocation information of the VM;

determining the type of the transition based on the whether the instruction is one of a first type to indicate a first type of transition or a second type to indicate a second type of transition, wherein the first type an initial transition to the VM and the second type is a subsequent transition to the VM; and

notifying a processor of the ~~initial type of the transition by the VMM executing one of a plurality of types of VM entry instructions, the one of the plurality of types of VM entry instructions associated with an initial rather than a subsequent transition.~~

57-58. (Canceled)